

a second optical coupling unit which couples an up data signal with the first wavelength and said examination signal from said first optical dividing unit so as to transmit a second coupled signal toward a host apparatus;

a second optical dividing unit which receives said second coupled signal from said second optical coupling unit so as to divide said second coupled signal into said up data signal with the first wavelength and said examination signal with the second wavelength; and

a monitoring unit which monitors a fault and a location of said fault by using said examination signal with the second wavelength.

2. (As Filed) The transmission line monitoring apparatus as claimed in claim 1, wherein said first optical coupling unit, said first optical dividing unit, said second optical coupling unit, and said second optical dividing unit are formed of passive elements.

3. (As Filed) The transmission line monitoring apparatus as claimed in claim 2, further comprising a first examination signal generator which generates said examination signal with the second wavelength.

4. (As Filed) The transmission line monitoring apparatus as claimed in claim 3, wherein said monitoring unit includes:

an alarm information output unit which monitors a signal level of said examination signal with the second wavelength and, if said signal level is lower than a predetermined signal level, then outputs alarm information; and

an alarm information displaying/transferring unit which, when said alarm information is outputted, displays said alarm information and insert said alarm information into said up data signal to be transmitted to said host apparatus.

5. (As Filed) The transmission line monitoring apparatus as claimed in claim 2, further comprising a second examination signal generator which divides an input down data signal into two signals, one signal being converted into said down data signal with the first wavelength, the other signal being converted into said examination signal with the second wavelength.

6. (As Filed) The transmission line monitoring apparatus as claimed in claim 5, wherein said monitoring unit includes:

an error information output unit which outputs synchronous error information and data

signal error information based on said examination signal with the second wavelength; and
 an error information displaying/transferring unit which, when said synchronous error information and said data signal error information are outputted, displays said error information and inserts said error information into said up data signal to be transmitted to said host apparatus.

7. (As Filed) The transmission line monitoring apparatus as claimed in claim 3, further comprising a first control unit which controls a start and stop of said first examination signal generator.

8. (As Filed) The transmission line monitoring apparatus as claimed in claim 4, further comprising a second control unit which controls start and stop of said alarm information output unit and start and stop of said alarm information display/transferring unit.

9. (As Filed) The transmission line monitoring apparatus as claimed in claim 7, further comprising a timer for managing said first control unit at given intervals.

10. (As Filed) The transmission line monitoring apparatus as claimed in claim 8, further comprising a command detecting unit which detects a command signal included in said down data signal so as to manage said first control unit based on said command signal.

11. (As Filed) The transmission line monitoring apparatus as claimed in claim 9, further comprising a command detecting unit which detects a command signal included in said down data signal so as to manage said first control unit based on said command signal.

Sub 7
 12. (Once Amended) A transmission line monitoring method monitoring faults occurring in a transmission line and in apparatus connected to the transmission line, said transmission line monitoring method comprising:

coupling a down data signal with a first wavelength and an examination signal with a second wavelength so as to transmit a first coupled signal to a lower apparatus;

receiving said first coupled signal and dividing said first coupled signal into said down data signal with the first wavelength and said examination signal with the second wavelength;

coupling an up data signal with the first wavelength and said examination signal with the second wavelength so as to transmit a second coupled signal towards a host apparatus;

receiving said second coupled signal and dividing said second coupled signal into said up data signal with the first wavelength and said examination signal with the second wavelength; and

monitoring a fault and a location of said fault by using said examination signal with the second wavelength.

13. (New) A transmission line monitoring method monitoring faults occurring in a transmission line and in apparatus connected to the transmission line, said transmission line monitoring method comprising:

generating an examination signal having a second wavelength from a data signal having a first wavelength;

coupling the data signal with the examination signal so as to transmit a first coupled signal from a host apparatus to a lower apparatus;

dividing the first coupled signal into the data signal with the first wavelength and said examination signal with the second wavelength at the lower apparatus;

coupling the data signal with the first wavelength and the examination signal with the second wavelength so as to transmit a second coupled signal from the lower apparatus to the host apparatus;

dividing said second coupled signal into the data signal with the first wavelength and the examination signal with the second wavelength at the host apparatus; and

monitoring a fault and a location of the fault by using the examination signal with the second wavelength generated from the data signal having the first wavelength.

14. (New) A transmission line monitoring method monitoring faults occurring in a transmission line and in apparatus connected to the transmission line, comprising:

controlling generation of an examination signal having a second wavelength and if the examination signal is generated, then

coupling a down data signal with a first wavelength to the examination signal with the second wavelength so as to transmit a first coupled signal to a lower apparatus;

dividing the first coupled signal into said down data signal with the first wavelength and the examination signal with the second wavelength;

coupling an up data signal with the first wavelength and the examination signal with the second wavelength so as to transmit a second coupled signal to a host apparatus;

dividing the second coupled signal into said up data signal with the first wavelength and said examination signal with the second wavelength; and

monitoring a fault and a location of said fault by using the examination signal with the second wavelength.

15. (New) A transmission line monitoring method monitoring faults occurring in a transmission line and in apparatus connected to the transmission line, said transmission line monitoring method comprising:

transmitting a first coupled signal that includes a down data signal having a first wavelength and an examination signal having a second wavelength from a host apparatus to a lower apparatus;

transmitting a second coupled signal that includes an up data signal with the first wavelength and the examination signal with the second wavelength from the lower apparatus to the host apparatus; and

monitoring a fault and a location of said fault by using the examination signal with the second wavelength.

REMARKS

In accordance with the foregoing, no new matter is being presented, and approval and entry are respectfully requested. Claims 1-15 are pending. Claims 1 and 12 have been amended. Claims 13 - 15 have been added.

Support for the amendments to the claims and the new claims can be found throughout the Application. For example, support for amended claims 1 and 12 is found in the Application at page 13, lines 23-35. Support for new claim 13 is found at page 17 lines 10-33 and Figs. 9 and 10, and support for new claim 14 is found at page 23 lines 7-37, page 24 lines 1-4, and Figs. 17 and 18. Support for new claim 15 is found in the discussion of Fig. 1.

In the Office Action at page 2, the Examiner rejected claims 1-8, 10 and 12 under 35 USC § 103 as being obvious over Koga (U.S. Patent No. 5,995,254) in view of Shimonura (U.S. Patent No. 6,404,525). In rejecting claims 1 and 12, the Examiner stated that it would have been obvious to include the monitoring unit of Shimonura in the transmission line monitoring of Koga to monitor and detect a transmission line fault. Office Action, page 3.

Independent claim 1 recites a monitoring unit which monitors a fault and a location of the fault by using an examination signal having a wavelength that is divided from a data signal

having a different wavelength. Applicant's approach has benefits that include, among others, eliminating the need for field surveys and not having to check a power state of customer apparatus in order to determine fault locations. Application, page 5.

Koga discloses a wavelength division multiplexing light transmitting system which monitors a transmission line comprising multiplexers and demultiplexers that multiplex and demultiplex a monitor signal from a signal light. As acknowledged by the Examiner, Koga does not describe or suggest a monitoring unit which monitors a fault and a location of the fault by using an examination signal having a wavelength that is divided from a data signal having a different wavelength.

Shimonura shows an optical signal deterioration monitor that detects an optical loss of wavelength. The deterioration monitor monitors receiving conditions of the respective light receivers 13-1 to 13-n and notifies monitored receiving conditions to the controller 19 by predetermined signals.

However, the monitoring unit in Shimonura does not describe or suggest monitoring a fault and a location of the fault by using an examination signal having a wavelength that is divided from a data signal having a different wavelength. Instead, Shimonura uses a general type of light monitor for optical networks. Accordingly, neither Koga or Shimonura, either alone or in combination, teach or suggest the features of independent claims 1 or 12. Applicant respectfully requests that claims 1, 2-11, which depend from claim 1, and 12 be allowed.

The Examiner also combined the disclosures of Koga and Shimonura in the obviousness rejections of claims 2, 3, 4, 5, 6, 7, 8, and 10. These dependent claims depend from the above-discussed independent claim 1 and are patentable over the prior art for the reasons discussed above. The dependent claims also recite additional features not taught or suggested by the prior art. For example, claim 3 recites an examination signal generator which generates the examination signal with the second wavelength. It is submitted that the dependent claims are independently patentable over the prior art.

In the Office Action at page 5, the Examiner rejected claims 9 and 11 under 35 USC § 103 as being obvious over Koga in view of Shimonura and further in view of Fassih-Nia (U.S. Patent No. 6,307,652). The Examiner stated that it would have been obvious to include the control unit with a timer of Fassih-Nia in the system of Koga and Shimonura. These dependent claims depend from the above-discussed independent claim 1 and are patentable over the prior art for the reasons discussed above. These dependent claims also recite additional features not taught or suggested by the prior art. For example, claim 11 recites a timer that manages a control unit. It is submitted that claims 9 and 11 are independently patentable over the prior art.

New claims 13-15 recite methods with claim elements that include "monitoring a fault and a location of said fault by using the examination signal with the second wavelength generated from the data signal having the first wavelength" in claim 13 and "monitoring a fault and a location of said fault by using the examination signal with the second wavelength" in claims 14 and 15. Applicant respectfully requests allowance of claims 13 - 15.

There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

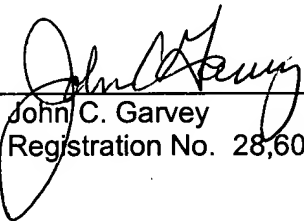
Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

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Date: 2-27-03

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VERSION WITH MARKINGS TO SHOW CHANGES MADE**IN THE CLAIMS:**

Please AMEND the following claims:

1. (Once Amended) A transmission line monitoring apparatus [for] monitoring faults occurring in a transmission line and in apparatus which are connected to the transmission line, said transmission line monitoring apparatus comprising:

a first optical coupling unit which couples a down data signal of a first wavelength and an examination signal of a second wavelength so as to transmit a first coupled signal to a lower apparatus;

a first optical dividing unit which receives said first coupled signal from said optical coupling unit so as to divide said first coupled signal into said down data signal with the first wavelength and said examination signal with the second wavelength;

a second optical coupling unit which couples an up data signal with the first wavelength and said examination signal from said first optical dividing unit so as to transmit a second coupled signal toward a host apparatus;

a second optical dividing unit which receives said second coupled signal from said second optical coupling unit so as to divide said second coupled signal into said up data signal with the first wavelength and said examination signal with the second wavelength; and

a monitoring unit which monitors a fault and a location of said fault by using said examination signal with the second wavelength.

2. (As Filed) The transmission line monitoring apparatus as claimed in claim 1, wherein said first optical coupling unit, said first optical dividing unit, said second optical coupling unit, and said second optical dividing unit are formed of passive elements.

3. (As Filed) The transmission line monitoring apparatus as claimed in claim 2, further comprising a first examination signal generator which generates said examination signal with the second wavelength.

4. (As Filed) The transmission line monitoring apparatus as claimed in claim 3, wherein said monitoring unit includes:

an alarm information output unit which monitors a signal level of said examination signal with the second wavelength and, if said signal level is lower than a predetermined signal level,

then outputs alarm information; and

an alarm information displaying/transferring unit which, when said alarm information is outputted, displays said alarm information and insert said alarm information into said up data signal to be transmitted to said host apparatus.

5. (As Filed) The transmission line monitoring apparatus as claimed in claim 2, further comprising a second examination signal generator which divides an input down data signal into two signals, one signal being converted into said down data signal with the first wavelength, the other signal being converted into said examination signal with the second wavelength.

6. (As Filed) The transmission line monitoring apparatus as claimed in claim 5, wherein said monitoring unit includes:

an error information output unit which outputs synchronous error information and data signal error information based on said examination signal with the second wavelength; and

an error information displaying/transferring unit which, when said synchronous error information and said data signal error information are outputted, displays said error information and inserts said error information into said up data signal to be transmitted to said host apparatus.

7. (As Filed) The transmission line monitoring apparatus as claimed in claim 3, further comprising a first control unit which controls a start and stop of said first examination signal generator.

8. (As Filed) The transmission line monitoring apparatus as claimed in claim 4, further comprising a second control unit which controls start and stop of said alarm information output unit and start and stop of said alarm information display/transferring unit.

9. (As Filed) The transmission line monitoring apparatus as claimed in claim 7, further comprising a timer for managing said first control unit at given intervals.

10. (As Filed) The transmission line monitoring apparatus as claimed in claim 8, further comprising a command detecting unit which detects a command signal included in said down data signal so as to manage said first control unit based on said command signal.

11. (As Filed) The transmission line monitoring apparatus as claimed in claim 9, further comprising a command detecting unit which detects a command signal included in said down data signal so as to manage said first control unit based on said command signal.

12. (Once Amended) A transmission line monitoring method [for] monitoring faults occurring in a transmission line and in apparatus connected to the transmission line, said transmission line monitoring method comprising[the steps of]:

[(a)]coupling a down data signal with a first wavelength and an examination signal with a second wavelength so as to transmit a first coupled signal to a lower apparatus;

[(b)]receiving said first coupled signal and dividing said first coupled signal into said down data signal with the first wavelength and said examination signal with the second wavelength;

[(c)]coupling an up data signal with the first wavelength and said examination signal with the second wavelength so as to transmit a second coupled signal towards a host apparatus;

[(d)]receiving said second coupled signal and dividing said second coupled signal into said up data signal with the first wavelength and said examination signal with the second wavelength; and

[(e)]monitoring a fault and a location of said fault by using said examination signal with the second wavelength.

Please ADD the following claims:

13. (New) A transmission line monitoring method monitoring faults occurring in a transmission line and in apparatus connected to the transmission line, said transmission line monitoring method comprising:

generating an examination signal having a second wavelength from a data signal having a first wavelength;

coupling the data signal with the examination signal so as to transmit a first coupled signal from a host apparatus to a lower apparatus;

dividing the first coupled signal into the data signal with the first wavelength and said examination signal with the second wavelength at the lower apparatus;

coupling the data signal with the first wavelength and the examination signal with the second wavelength so as to transmit a second coupled signal from the lower apparatus to the host apparatus;

dividing said second coupled signal into the data signal with the first wavelength and the examination signal with the second wavelength at the host apparatus; and

monitoring a fault and a location of the fault by using the examination signal with the second wavelength generated from the data signal having the first wavelength.

14. (New) A transmission line monitoring method monitoring faults occurring in a transmission line and in apparatus connected to the transmission line, comprising:

controlling generation of an examination signal having a second wavelength and if the examination signal is generated, then

coupling a down data signal with a first wavelength to the examination signal with the second wavelength so as to transmit a first coupled signal to a lower apparatus;

dividing the first coupled signal into said down data signal with the first wavelength and the examination signal with the second wavelength;

coupling an up data signal with the first wavelength and the examination signal with the second wavelength so as to transmit a second coupled signal to a host apparatus;

dividing the second coupled signal into said up data signal with the first wavelength and said examination signal with the second wavelength; and

monitoring a fault and a location of said fault by using the examination signal with the second wavelength.

15. (New) A transmission line monitoring method monitoring faults occurring in a transmission line and in apparatus connected to the transmission line, said transmission line monitoring method comprising:

transmitting a first coupled signal that includes a down data signal having a first wavelength and an examination signal having a second wavelength from a host apparatus to a lower apparatus;

transmitting a second coupled signal that includes an up data signal with the first wavelength and the examination signal with the second wavelength from the lower apparatus to the host apparatus; and

monitoring a fault and a location of said fault by using the examination signal with the second wavelength.